



# Profiling Air Quality over Maryland

**Overview:** The Maryland Department of the Environment (MDE) Ambient Air Monitoring Program is actively seeking to characterize the amount of interstate pollutant transport arriving in Maryland through several different measurement initiatives. Vertical profiles of aloft air quality and meteorological parameters have been measured through a variety of techniques over the past decade either directly by MDE or indirectly by MDE providing funding to several local universities. These initiatives included aircraft trace gas profiles and transects, radar wind and temperature profiles, LIDAR aerosol profiles, surface and elevated air monitoring station measurements, and most recently an ozonesonde measurement campaign during the summers of 2005 and 2006. For the ozonesonde measurement campaign, MDE prepared the scope of work, designed the data products, and proposed a seasonal and diurnal schedule, which was then carried out through a contract with the Howard University (HU) Physics Department. The goals of the campaign were three-fold: The primary goal was to collect ozone profiles to capture residual layer transport of ozone via the predominant westerly wind direction and the nocturnal low-level jet (LLJ). Secondly, the transport measurements would be evaluated to provide insight to interstate pollutant transport and equitable interstate control strategies. Finally, the ozonesonde launches would be rolled into the MDE daily air quality forecasting and outreach programs. The aircraft trace gas profiles and transects have been carried out through a contract with the University of Maryland (UMD) since the early 1990's. The purpose of these measurements is to determine the pollutant concentrations aloft coming into Maryland. The upper air wind profilers are operated by MDE at the Piney Run and Beltsville air monitoring sites. The wind profilers have been instrumental in measuring the nocturnal low-level jet. The Polar ELF LIDAR is located in Catonsville, Maryland at the University of Maryland at Baltimore County. The data from the lidar have been used to show aloft pollution and turbulent mixing over Maryland. The MDE currently has 23 ambient air monitoring sites located throughout Maryland. Two of these are classified as research sites (one is at near-sea level and the other is an elevated site) due to the vast number of instruments deployed at each location. MDE has been experimenting with unique data visualization techniques to provide greater insight into these rich datasets.

## Ozonesonde Measurements



## Upper-Air Radar Wind Profiler & RASS



## Surface & Elevated Station Measurements



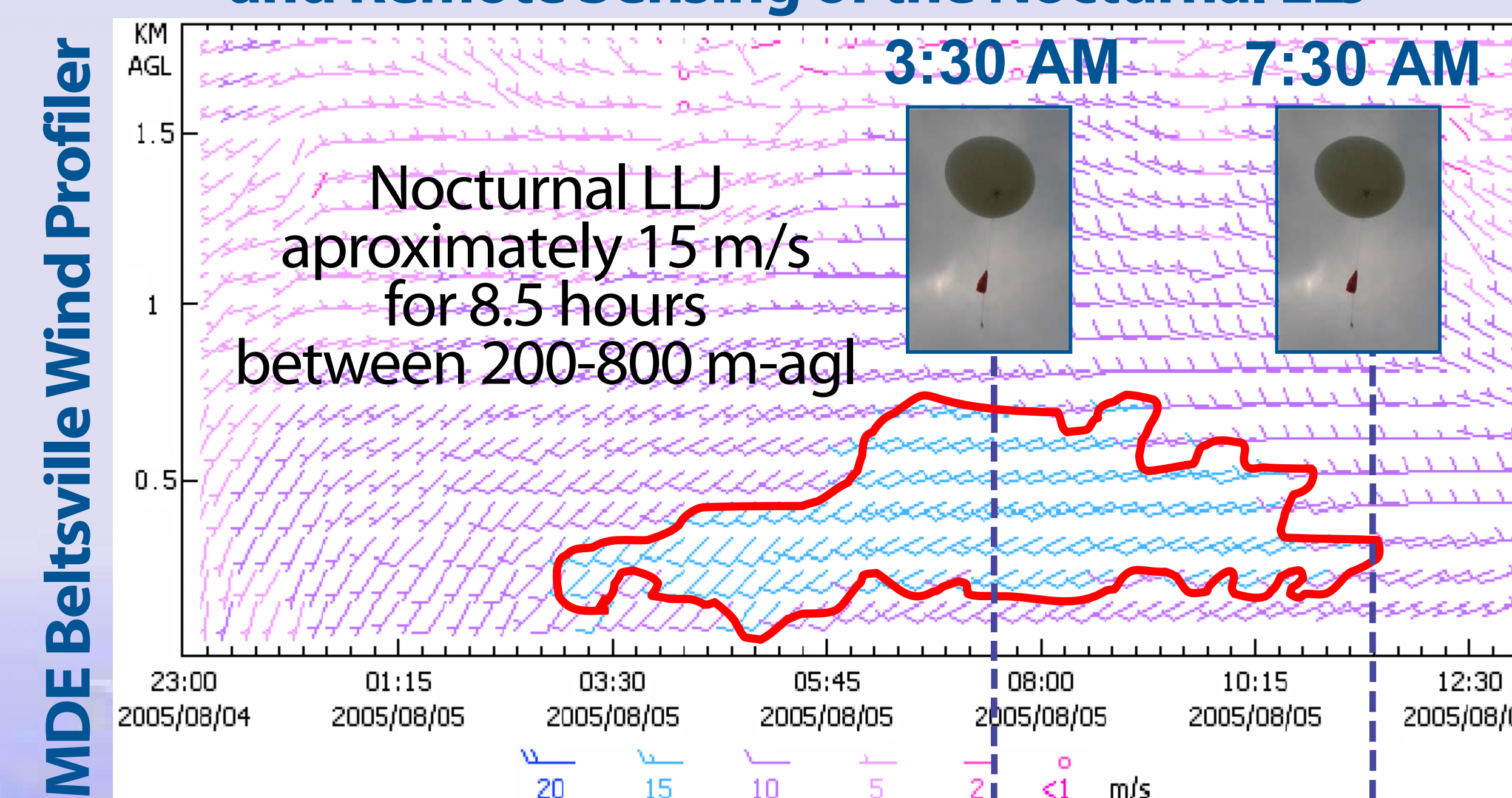
## Aircraft Measurements



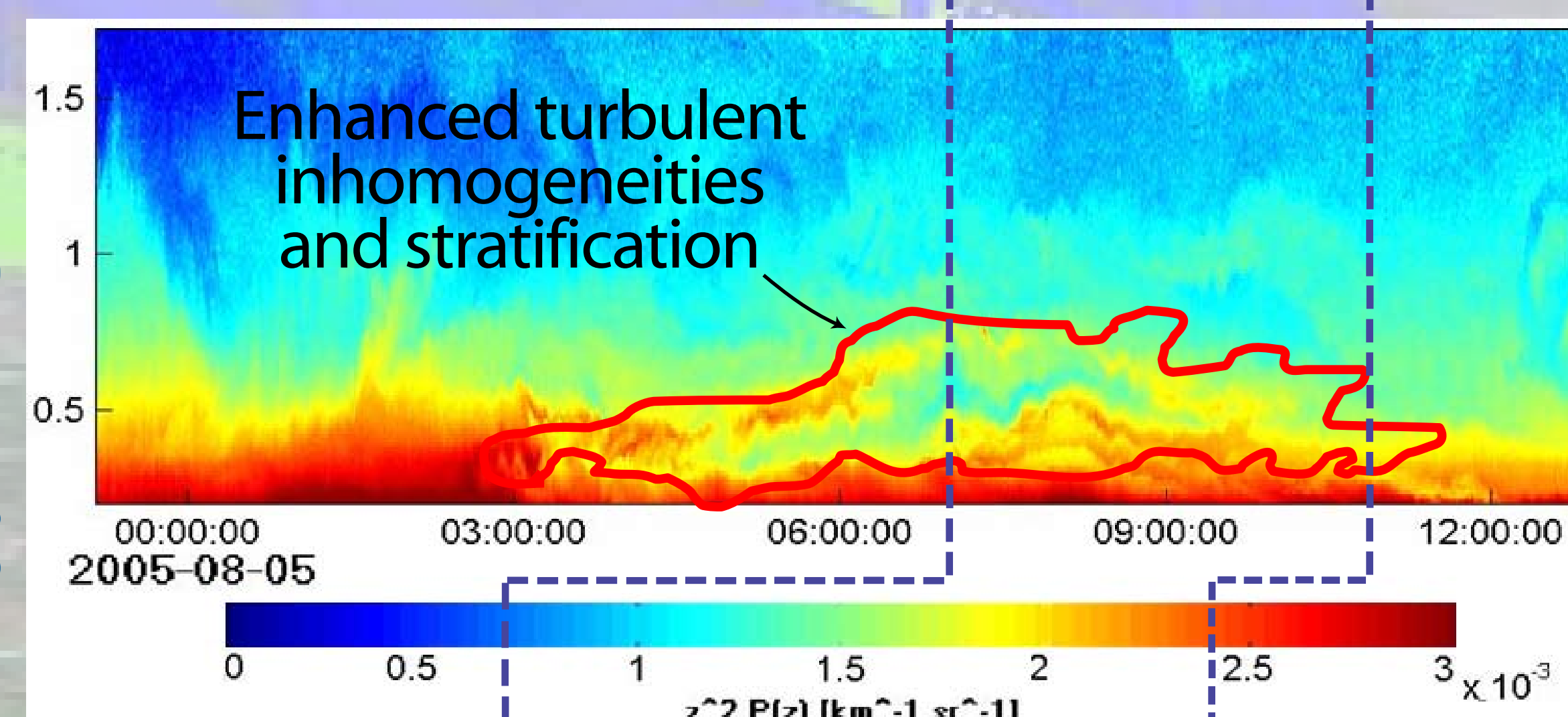
## LIDAR - Aerosol Measurements



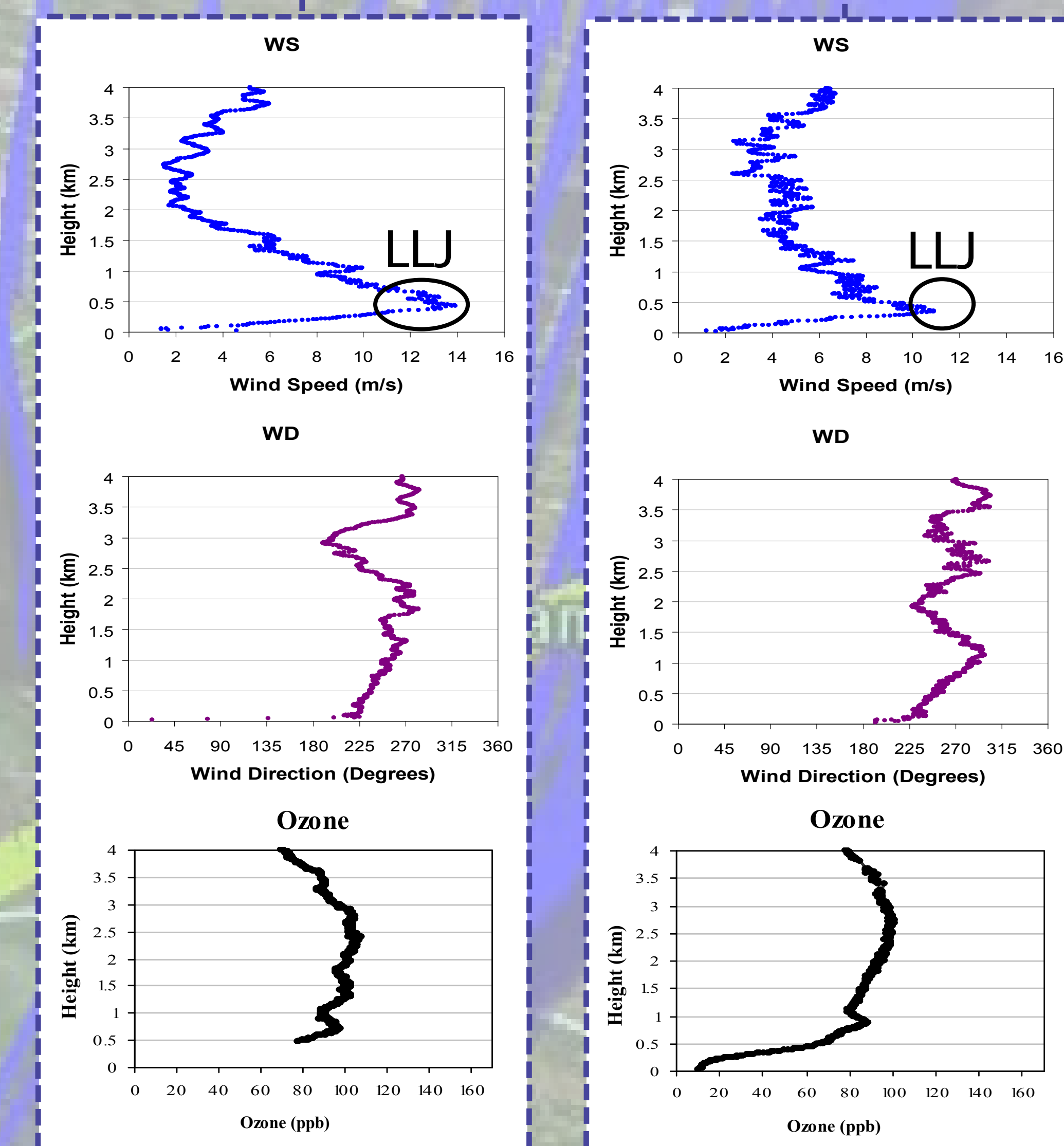
## August 4-5, 2005: In-Situ Measurements and Remote Sensing of the Nocturnal LLJ



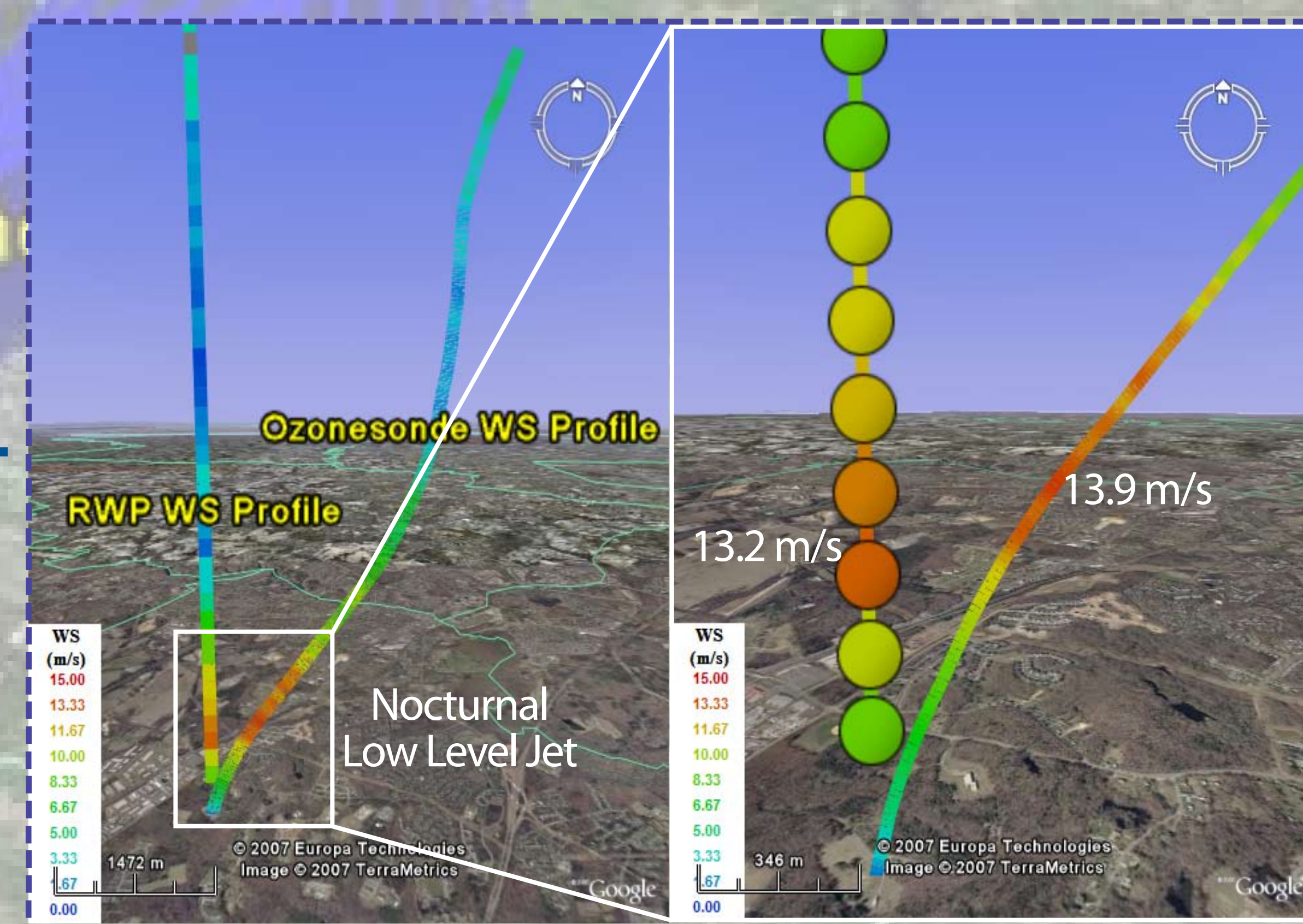
## UMBC Catonsville Polar ELF LIDAR



## Ozonesonde Data (1-sec Interval)



## WS Comparison



## August 12-13, 2005: Transport Mechanisms in a High Ozone Episode

